PB-240 344

ROUND LAKE, SARATOGA COUNTY, NEW YORK

Pacific Northwest Environmental Research Laboratory

Prepared for:

National Environmental Research Center, Las Vegas, Nevada
National Environmental Research Center, Corvallis, Oregon
New York National Guard
New York State Department of Environmental Conservation

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16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivded according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
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REPORT
ON
ROUND LAKE
SARATOGA COUNTY
NEW YORK

EPA REGION II

WORKING PAPER No. 166

WITH THE COOPERATION OF THE

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

AND THE

NEW YORK NATIONAL GUARD

DECEMBER, 1974

CONTENTS

	Page
Foreword	ii
List of New York Study Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Conclusions	1
II. Lake and Drainage Basin Characteristics	3
III. Lake Water Quality Summary	4
IV. Nutrient Loadings	8
V. Literature Reviewed	13
VI. Appendices	14

F O R E W O R D

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the New York Department of Environmental Conservation for professional involvement and to the New York National Guard for conducting the tributary sampling phase of the Survey.

Henry L. Diamond, Commissioner of the New York Department of Environmental Conservation, and Leo J. Hetling, Director, and Italo G. Carcich, Senior Sanitary Engineer, Environmental Quality Research, Department of Environmental Conservation, provided invaluable lake documentation and counsel during the Survey.

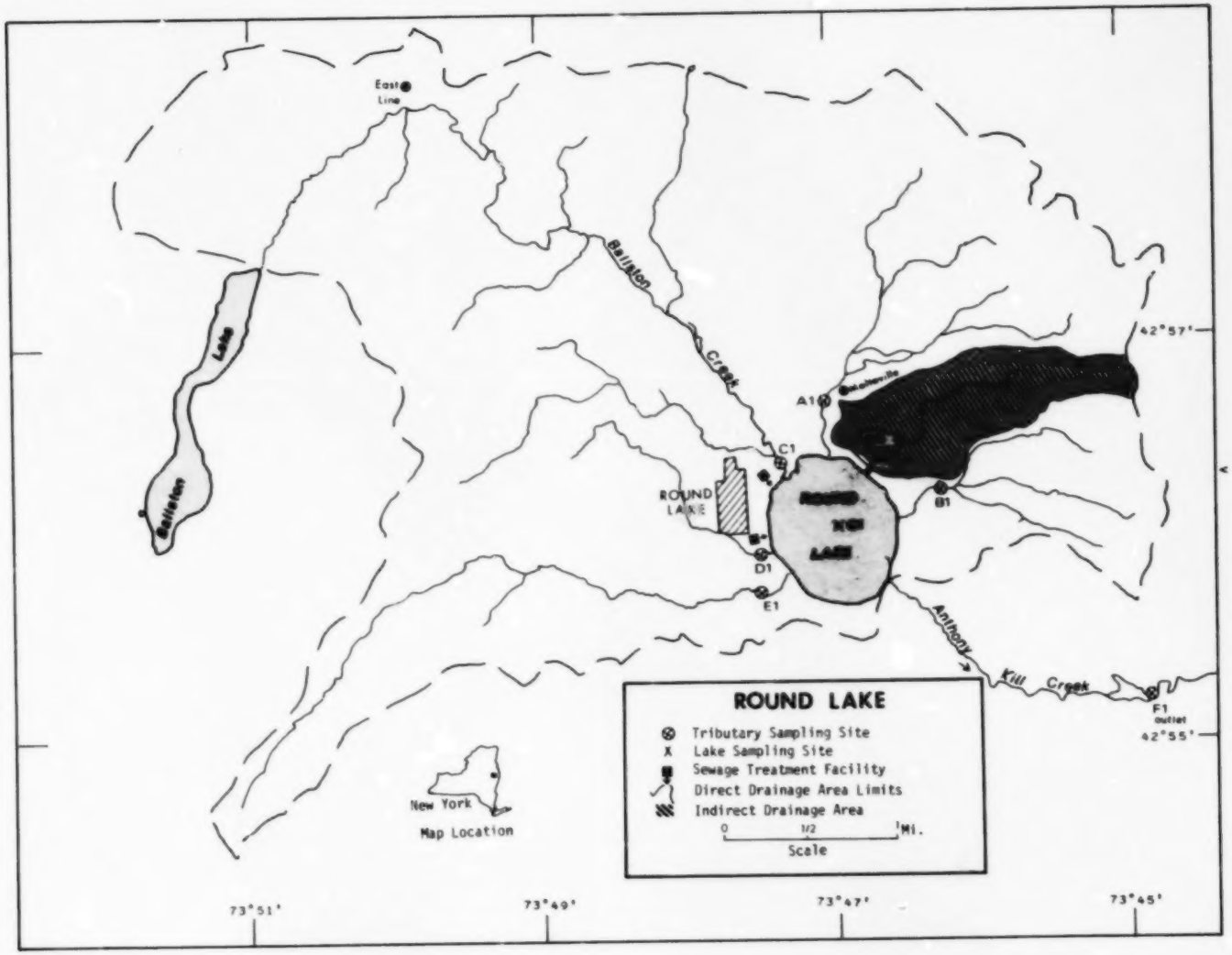
Major General John C. Baker, the Adjutant General of New York, and Project Officer Lieutenant Colonel Fred Peters, who directed the volunteer efforts of the New York National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF NEW YORK

LAKE NAME	COUNTY
Allegheny Reservoir	Cattaraugas, NY; McLean, Warren, PA
Black	St. Lawrence
Canadaigua	Ontario
Cannonsville	Delaware
Carry Falls	St. Lawrence
Cassadaga	Chautauqua
Cayuga	Seneca, Tompkins
Champlain	Clinton, Essex, NY; Addison, Chittenden, Franklin, VT
Chautauqua	Chautauqua
Conesus	Livingston
Cross	Cayuga, Onondaga
Goodyear	Otsego
Huntington	Sullivan
Keuka	Ontario
Long	Hamilton
Lower St. Regis	Franklin
Otter	Cayuga
Owasco	Cayuga
Raquette Pond	Franklin
Round	Saratoga
Sacandaga Res.	Fulton, Saratoga
Saratoga	Saratoga
Schroon	Essex, Warren
Seneca	Seneca, Schyler, Yates
Swan	Sullivan
Swinging Bridge Res.	Sullivan


East Line
Ballston Lake
Ballston Creek
A1
C1
B1
D1
E1
ROUND LAKE
Anthony Kill Creek
F1 outlet
42°57'
42°55'
73°51'
73°49'
73°47'
73°45'
New York
Map Location
ROUND LAKE
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Direct Drainage Area Limits
Indirect Drainage Area
0 1/2 1 Mi.
Scale

ROUND LAKE

STORET NO. 3630

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Round Lake is eutrophic. Of the 26 New York lakes sampled in the fall of 1972, 24 had less mean total phosphorus, 23 had less mean dissolved phosphorus, and 19 had less inorganic nitrogen. For all New York data, 23 lakes had less mean chlorophyll a, and 23 had greater Secchi disc transparency.

B. Rate-Limiting Nutrient:

A significant loss of nutrients occurred in the assay sample from the time of collection to the beginning of the assay, and the results are not indicative of conditions in the lake. The lake data indicate that the lake was phosphorus limited in the fall (the N/P ratio was 16/1) but nitrogen limited at the other sampling times (the N/P ratios were 7/1 or less).

C. Nutrient Controllability:

1. Point sources--During the sampling year, Round Lake received a total phosphorus load at a rate more than five times the rate proposed by Vollenweider (in press) as "dangerous"; i.e., a eutrophic rate (see page 12). It is estimated that the Village of Round Lake contributed about 15% of that load. However, even complete removal of phosphorus at this source would still leave a loading rate of 4.44 $g/m^2/yr$ (in excess of four

times the eutrophic rate), and it is concluded that point-source phosphorus control would have little effect on the existing trophic condition of Round Lake.

2. Non-point sources (see page 12)--The phosphorus exports of Round Lake tributaries were quite high as compared to unimpacted New York streams elsewhere (e.g., the mean annual export of 11 tributaries of nearby Sacandaga Reservoir* was 53 lbs P/ mi^2). The nutrient exports of the unnamed streams at stations D-1 and E-1 were exceptionally high (particularly E-1) and it is likely that those streams were impacted by point sources.

In all, it is estimated that non-point sources contributed about 85% of the total phosphorus load to Round Lake during the sampling year.

* Working Paper No. 167.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

A. Lake Morphometry†:

1. Surface area: 320 acres.
2. Mean depth: unknown.
3. Maximum depth: >16 feet.
4. Volume: unknown.
5. Mean hydraulic retention time: unknown.

B. Tributary and Outlet:
(See Appendix A for flow data)

1. Tributaries -

Name	Drainage area*	Mean flow*
Unnamed Creek (A-1)	2.9 mi^2	4.2 cfs
Unnamed Creek (B-1)	0.9 mi^2	1.3 cfs
Ballston Creek	17.8 mi^2	25.7 cfs
Unnamed Creek (D-1)	0.6 mi^2	0.9 cfs
Unnamed Creek (E-1)	2.2 mi^2	3.2 cfs
Minor tributaries & immediate drainage -	2.1 mi^2	3.2 cfs
Totals	26.5 mi^2	39.0 cfs

2. Outlet -

Anthony Kill Creek	27.0 mi^2**	39.0 cfs**

C. Precipitation***:

1. Year of sampling: 50.9 inches.
2. Mean annual: 46.1 inches.

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† Greeson and Robison, 1970.
* Drainage areas are accurate within ±5%, except for small basins (±10%); mean daily flows are accurate within ±5 to 25%; and normalized mean monthly flows are accurate within ±15%.
** Includes area of lake; values adjusted to actual lake outlet.
*** See Working Paper No. 1, "Survey Methods".

III. LAKE WATER QUALITY SUMMARY

Round Lake was sampled three times during the open-water season of 1972 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two or more depths at one station on the lake (see map, page v). During each visit, a single depth-integrated (near bottom to surface) sample was collected for phytoplankton identification and enumeration; and a similar sample was taken for chlorophyll a analysis. During the last visit, a five-gallon depth-integrated sample was collected for algal assays. The maximum depth sampled was 16 feet.

The results obtained are presented in full in Appendix B, and the data for the fall sampling period, when the lake was essentially well-mixed, are summarized below. Note, however, the Secchi disc summary is based on all values.

For differences in the various parameters at the other sampling times, refer to Appendix B.

A. Physical and chemical characteristics:

Parameter	Minimum	Mean	Median	Maximum
		FALL VALUES (10/10/72)		
Temperature (Cent.)	13.7	13.8	13.8	13.9
Dissolved oxygen (mg/l)	7.0	7.2	7.2	7.4
Conductivity (μmhos)	253	261	260	270
pH (units)	7.6	7.6	7.6	7.7
Alkalinity (mg/l)	81	82	82	83
Total P (mg/l)	0.078	0.094	0.082	0.122
Dissolved P (mg/l)	0.028	0.033	0.035	0.037
NO_2 + NO_3 (mg/l)	0.120	0.127	0.130	0.130
Ammonia (mg/l)	0.400	0.403	0.400	0.410
		ALL VALUES		
Secchi disc (inches)	30	46	36	72

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Number per ml
05/28/72	1. Asterionella	1,396
	2. Synedra	1,396
	3. Tabellaria	472
	4. Cryptomonas	472
	5. Stephanodiscus	208
	6. Cyclotella	170
	Other genera	509
	Total	4,623
07/25/72	1. Merismopedia	1,266
	2. Anabaena	497
	3. Polycystis	309
	4. Fragilaria	226
	5. Chroococcus	166
	Other genera	445
	Total	2,909
10/10/72	1. Flagellates	1,358
	2. Cyclotella	943
	3. Dinobyron	830
	4. Fragilaria	717
	5. Dictyosphaerium	642
	Other genera	3,359
	Total	7,849

2. Chlorophyll *a* -
(Because of instrumentation problems during the 1972 sampling, the following values may be in error by plus or minus 20 percent.)

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
05/28/72	01	35.9
07/25/72	01	24.8
10/10/72	01	24.3

C. Limiting Nutrient Study:

The algal assay results are not considered indicative of lake conditions because of nutrient losses in the sample during shipping. However, the lake data indicate phosphorus limitation in October (the N/P ratio was 16/1). At the other sampling times, the data indicate nitrogen limitation (i.e., N/P ratios were 7/1 or less, and nitrogen limitation would be expected).

IV. NUTRIENT LOADINGS
(See Appendix C for data)

For the determination of nutrient loadings, the New York National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of April and May when two samples were collected. Sampling was begun in November, 1972, and was completed in October, 1973.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the New York District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. However, the "outlet" of Round Lake as sampled at station F-1 (see map, page v) included 25.9 square miles of additional drainage, and the nutrient loads measured were adjusted by subtracting the areal contributions of the excess drainage area which were estimated in the same way as the ZZ area.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in lbs/mi^2/year, at stations B-1, C-1, and D-1 and multiplying the means by the ZZ area in mi^2.

The Village of Round Lake did not participate in the Survey, and nutrient loads were estimated at 2.5 lbs P and 7.5 lbs N/capita/year.

* See Working Paper No. 1.

A. Waste Sources:

1. Known muncipal† -

Name	Pop. Served	Treatment	Mean Flow (mgd)	Receiving Water
Round Lake	886*	prim. clarifier	0.089**	Round Lake

2. Known industrial - None

† Anonymous, 1972.
* 1970 Census.
** Estimated at 100 gal/capita/day.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	lbs P/ yr	% of total
a. Tributaries (non-point load) -		
Unnamed Creek (A-1)	350	2.3
Unnamed Creek (B-1)	240	1.6
Ballston Creek	2,580	17.3
Unnamed Creek (D-1)	530	3.6
Unnamed Creek (E-1)	8,020	53.8
b. Minor tributaries & immediate drainage (non-point load) -	910	6.1
c. Known municipal -		
Round Lake	2,220	14.9
d. Septic tanks - Unknown	-	-
e. Known industrial - None	-	-
f. Direct precipitation* -	50	0.3
Total	14,900	100.0

2. Outputs -

Lake outlet - Anthony Kill Creek 12,260

3. Net annual P accumulation - 2,640 pounds.

* See Working Paper No. 1.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Unnamed Creek (A-1)	8,060	7.7
Unnamed Creek (B-1)	2,760	2.6
Ballston Creek	46,460	44.4
Unnamed Creek (D-1)	2,910	2.8
Unnamed Creek (E-1)	27,340	26.1
b. Minor tributaries & immediate drainage (non-point load) -	7,370	7.1
c. Known municipal -		
Round Lake	6,650	6.4
d. Septic tanks - Unknown	-	-
e. Known industrial - None	-	-
f. Direct precipitation* -	3,080	2.9
Total	104,620	100.0

2. Outputs -

Lake outlet - Anthony Kill Creek 181,670

3. Net annual N loss - 77,050 pounds

* See Working Paper No. 1.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	lbs P/mi^2/yr	lbs N/mi^2/yr
Unnamed Creek (A-1)	121	2,779
Unnamed Creek (B-1)	267	3,067
Ballston Creek	145	2,610
Unnamed Creek (D-1)	883	4,850
Unnamed Creek (E-1)	3,645	12,427

E. Yearly Loading Rates:

In the following table, the existing phosphorus loading rates are compared to those proposed by Vollenweider (in press). Essentially, his "dangerous" rate is the rate at which the receiving water would become eutrophic or remain eutrophic; his "permissible" rate is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic rate would be considered one between "dangerous" and "permissible".

	Total Phosphorus		Total Nitrogen	
Units	Total	Accumulated	Total	Accumulated
lbs/acre/yr	46.6	8.2	326.9	loss*
grams/m^2/yr	5.22	0.92	36.6	-

Vollenweider loading rates for phosphorus (g/m^2/yr) based on surface area and mean outflow of Round Lake:

"Dangerous" (eutrophic rate)	1.00
"Permissible" (oligotrophic rate)	0.50

* There was an apparent loss of nitrogen during the sampling year. This may have been due to nitrogen fixation in the lake, solubilization of previously sedimented nitrogen, recharge with nitrogen-rich ground water, unknown and unsampled point sources discharging directly to the lake, or underestimation of the nitrogen load from the Village of Round Lake. Whatever the cause, a similar nitrogen loss has occurred at Shagawa Lake, Minnesota, which has been intensively studied by EPA's National Eutrophication Research and Lake Restoration Branch.

V. LITERATURE REVIEWED

Anonymous, 1972, Municipal S.T.W. inventory. NY Dept. of Env. Cons., Albany.

Greeson, Phillip E., and F. Luman Robison, 1970. Characteristics of New York Lakes. Part 1 - Gazateer of lakes, ponds, and reservoirs. Bull. 68, U.S. Dept. of Int. and NY Dept. of Env. Cons., Albany.

Vollenweider, Richard A. (in press). Input-output models. Schweiz. A. Hydrol.

VII. APPENDICES

APPENDIX A

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3630 ROUND LAKE

TOTAL DRAINAGE AREA OF LAKE 52.94

TRIBUTARY	SUB-DRAINAGE AREA	NORMALIZED FLOWS JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
3630A1	2.92	3.86	4.97	8.41	10.80	5.31	3.15	2.10	1.43	1.77	2.23	3.78	3.71	4.21
3630B1	0.87	1.15	1.21	2.51	3.23	1.58	0.94	0.63	0.43	0.53	0.67	1.12	1.10	1.26
3630C1	17.80	23.50	24.80	51.30	66.00	32.40	19.20	12.80	8.72	10.80	13.60	23.00	22.40	25.69
3630D1	0.60	0.79	0.84	1.73	2.23	1.09	0.65	0.43	0.29	0.37	0.46	0.78	0.76	0.87
3630E1	2.19	2.90	3.05	6.31	8.12	3.98	2.37	1.57	1.07	1.33	1.68	2.83	2.78	3.16
3630F1	52.94	70.00	73.80	152.00	196.00	96.30	57.20	38.10	25.90	32.20	40.50	69.50	67.20	76.45
3630Z2	27.59	3.37	3.56	7.34	9.46	4.64	2.76	1.83	1.25	1.55	1.95	3.30	3.24	3.68

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 52.94
SUM OF SUB-DRAINAGE AREAS = 51.97

TOTAL FLOW IN = 467.08
TOTAL FLOW OUT = 918.70

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3630A1	11	72	9.45	4	6.31				
	12	72	6.51	1	7.43				
	1	73	10.50	5	9.80				
	2	73	6.32	5	10.60				
	3	73	12.99	5	115.00				
	4	73	10.50	7	6.40	15	5.00		
	5	73	9.26	8	4.12	20	6.20		
	6	73	4.63	5	4.20				
	7	73	3.48	9	3.50				
	8	73	3.27	5	3.20				
	9	73	1.14	6	3.34				
	10	73	1.58	8	3.04				
3630B1	11	72	2.80	4	2.43				
	12	72	1.93	1	2.15				
	1	73	3.12	5	2.60				
	2	73	1.88	5	3.05				
	3	73	3.86	9	2.83				
	4	73	3.15	7	2.28	15	1.44		
	5	73	2.76	8	1.00	20	2.02		
	6	73	1.38	5	0.94				
	7	73	0.85	9	0.52				
	8	73	0.35	5	0.21				
	9	73	0.34	6	0.33				
	10	73	0.38	8	0.13				

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3630 ROUND LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3630C1	11	72	57.50	4	11.50				
	12	72	39.60	1	10.20				
	1	73	63.70	5	12.40				
	2	73	38.50						
	3	73	78.90	9	286.80				
	4	73	64.40	7	114.00	15	28.80		
	5	73	56.50	8	8.00	20	91.00		
	6	73	28.20	5	11.00				
	7	73	17.30	9	3.50				
	8	73	7.12	5	0.81				
	9	73	6.94	6	1.60				
	10	73	7.66	8	0.38				
3630D1	11	72	1.94	4	1.14				
	12	72	1.34	1	1.00				
	1	73	2.15	5	1.23				
	2	73	1.30	6	1.30				
	3	73	2.66	9	6.00				
	4	73	0.18	7	2.04	15	0.96		
	5	73	1.98	8	0.49	20	1.87		
	6	73	0.95	5	0.54				
	7	73	0.58	9	0.29				
	8	73	0.24	5	0.10				
	9	73	0.24	6	0.16				
	10	73	0.26	8	0.10				
3630E1	11	72	7.08	4	2.30				
	12	72	4.88	1	2.04				
	1	73	7.86	5	2.48				
	2	73	4.73	5	2.93				
	3	73	9.78	9	15.70				
	4	73	7.92	7	4.15	15	2.30		
	5	73	6.94	8	1.20	20	4.40		
	6	73	3.48	5	13.30				
	7	73	2.12	9	0.71				
	8	73	0.47	5	0.50				
	9	73	0.86	6	0.60				
	10	73	0.95	8	0.43				
3630F1	11	72	209.00	4	83.10				
	12	72	144.00	1	74.00				
	1	73	231.00	5	90.00				
	2	73	140.00	5	106.00				
	3	73	286.00	7	165.00				
	4	73	191.00	7	332.00	15	144.00		
	5	73	168.00	8	62.00	20	388.00		
	6	73	84.10	5	64.00				
	7	73	51.60	9	21.00				
	8	73	21.20	5	13.50				
	9	73	70.70	6	19.20				
	10	73	22.80	8	9.90				

TRIBUTARY FLOW INFORMATION FOR NEW YORK 11/26/74

LAKE CODE 3630 ROUND LAKE

MEAN MONTHLY FLOWS AND DAILY FLOWS

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3630ZZ	11	72	8.25	4	6.40				
	12	72	5.69	1	5.69				
	1	73	9.13	5	6.91				
	2	73	5.52	5	8.16				
	3	73	11.30	9	20.70				
	4	73	9.23	7	12.00	15	6.12		
	5	73	8.09	8	3.34	20	11.20		
	6	73	4.06	5	3.65				
	7	73	2.49	9	2.04				
	8	73	1.02	5	1.16				
	9	73	1.00	6	1.47				
	10	73	1.10	8	0.96				

APPENDIX B

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 74/11/26

363001
42 56 03.0 073 47 00.0
ROUND LAKE
36 NEW YORK

11EPALES 2111202
3 0012 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00630 NO2&NO3 N-TOTAL MG/L	00610 NH3-N TOTAL MG/L	00665 PHOS-TOT MG/L P	00666 PHOS-DIS MG/L P
72/05/28	14	55 0000	22.4	11.1	72	280	8.80	68	0.030	0.070	0.041	0.023
	14	55 0010	14.9	9.7		280	7.60	68	0.030	0.040	0.075	0.016
72/07/25	19	35 0000			36	245	9.30	75	0.050	0.060	0.033	0.016
	19	35 0004	27.5	10.6		250	9.20	75	0.070	0.090	0.044	0.019
	19	35 0015	15.9	0.0		260	7.40	77	0.040	0.420	0.112	0.074
72/10/10	16	20 0000			30	253	7.55	83	0.120	0.400	0.082	0.037
	16	20 0004	13.9	7.4		270	7.65	82	0.130	0.410	0.122	0.035
	16	20 0016	13.7	7.0		260	7.60	81	0.130	0.400	0.078	0.028

DATE FROM TO	TIME OF DAY	DEPTH FEET	32217 CHLRPHYL A UG/L
72/05/28	14	55 0000	35.9J
72/07/25	19	35 0000	24.8J
72/10/10	16	20 0000	24.3J

J VALUE KNOWN TO BE IN ERROR

APPENDIX C

TRIBUTARY DATA

STORET RETRIEVAL DATE 74/11/26

3630A1 LS3630A1
42 56 30.0 073 47 00.0
UNNAMED CREEK
36 7.5 ROUND LAKE
T/ROUND LAKE
MALTAVILLE RD BRIDGE IN MALTAVILLE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	12	14	0.247	0.250	0.056	0.010	0.019
72/12/01	11	10	0.330	0.870	0.034	0.008	0.026
73/01/05	12	40	0.330	0.210	0.025	0.009	0.028
73/02/05	14	50	0.310	0.290	0.038	0.010	0.045
73/03/05	10	37	0.270	2.100	0.050	0.011	0.300
73/04/07	11	10	0.240	0.560	0.031	0.010	0.075
73/04/15	17	00	0.220	0.850	0.020	0.008	0.040
73/05/08	20	45	0.210	0.390	0.021	0.010	0.060
73/05/20	20	00	0.210	0.780	0.027	0.010	0.040
73/06/05	16	40	0.250	0.610	0.011	0.012	0.055
73/07/09	22	00	0.252	1.680	0.038	0.005K	0.030
73/08/05	12	10	0.180	0.120	0.018	0.011	0.025
73/09/06	19	05	0.198	1.150	0.032	0.014	0.085
73/10/08	21	40	0.150	0.190	0.017	0.008	0.025

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

363081 LS363081
42 56 30.0 073 46 30.0
UNNAMED CREEK
36 7.5 ROUND LAKE
T/ROUND LAKE
ST HWY 67 BRIDGE 1 MI SE OFMALTAVILLE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	12 10		0.310	0.380	0.034	0.021	0.046
72/12/01	11 20		0.290	0.300	0.010	0.013	0.029
73/01/05	12 45		0.400	0.160	0.024	0.013	0.027
73/02/05	14 35		0.300	1.380	0.132	0.046	0.195
73/03/09	10 35		0.350	2.300	0.115	0.014	0.400
73/04/07	11 00		0.160	1.000	0.022	0.009	0.065
73/04/15	16 50		0.140	1.500	0.068	0.015	0.035
73/05/08	20 10		0.089	1.540	0.052	0.019	0.065
73/05/20	20 21		0.138	1.100	0.040	0.022	0.040
73/06/05	16 30		0.052	0.335	0.014	0.021	0.050
73/07/09	21 55		0.044	0.910	0.032	0.018	0.095
73/08/05	12 00		0.017	0.750	0.273	0.038	0.077
73/09/06	19 40		0.036	0.920	0.130	0.028	0.100
73/10/09	21 35		0.017	0.630	0.029	0.048	0.135

STORET RETRIEVAL DATE 74/11/26

3630C1 LS3630C1
42 56 30.0 073 47 30.0
BALLSTON CREEK
36 7.5 ROUND LAKE
T/ROUND LAKE
MALTAVILLE RD BRIDGE NE OF ROUND LAKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04			0.140	0.500	0.068	0.015	0.032
72/12/01	11 05		0.132	0.365	0.015	0.008	0.020
73/01/05	12 50		0.280	0.360	0.021	0.005K	0.015
73/02/05	15 00		0.273	0.390	0.033	0.010	0.035
73/03/09	10 40		0.231	0.900	0.063	0.013	0.100
73/04/07	11 45		0.098	1.200	0.072	0.005K	0.040
73/04/15	17 20		0.105	0.670	0.026	0.008	0.020
73/05/08	20 20		0.110	0.640	0.026	0.018	0.065
73/05/20			0.046	0.750	0.027	0.014	0.045
73/06/05	16 50		0.315	0.870	0.029	0.056	0.095
73/07/09	22 15		0.280	1.100	0.030	0.046	0.080
73/08/05	12 20		0.168	0.480	0.052	0.022	0.055
73/09/06	16 40		0.740	0.965	0.076	0.026	0.070
73/10/04	21 50		0.240	0.420	0.028	0.012	0.035

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 74/11/26

363001 LS363001
42 56 00.0 073 47 30.0
UNNAMED CREEK
36 7.5 ROUND LAKE
T/ROUND LAKE
ST HWY 9 BRIDGE SE OF ROUNDLAKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	12 25		0.815	0.920	0.320	0.176	0.294
72/12/01	11 00		0.850	0.670	0.154	0.095	0.120
73/01/05	12 55		0.790	2.095	0.930	0.500	0.690
73/03/09	10 43		0.250	0.780	0.060	0.013	0.102
73/04/07	12 00		0.610	0.910	0.110	0.070	0.165
73/04/15	17 30		0.450	1.050	0.086	0.126	0.230
73/05/08	20 20		0.550	0.970	0.189	0.399	0.630
73/05/20	20 52		0.420	1.260	0.170	0.230	0.460
73/06/05	17 00		0.670	0.970	0.110	0.252	0.395
73/07/09	22 20		1.120	0.690	0.069	0.180	0.260
73/08/05	12 30		0.710	1.780	0.300	0.200	0.370
73/09/06	18 00		0.480	1.000	0.210	0.090	0.150
73/10/08	22 00		0.840	0.940	0.098	0.210	0.320

STORET RETRIEVAL DATE 74/11/26

3630E1 LS3630E1
42 56 00.0 073 47 30.0
UNNAMED CREEK
36 7.5 ROUND LAKE
T/ROUND LAKE
ST HWY 9 BRIDGE .5 MI S OF ROUND LAKE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	12 30		0.937	3.800	0.300	0.270	2.600
72/12/01	10 55		1.040	1.400	0.180	1.260	1.680
73/01/05	13 00		1.440	2.400	0.670	1.100	1.250
73/02/05	15 10		1.100	2.800	1.160	0.700	1.200
73/03/09	10 47		0.370	1.120	0.160	0.061	0.210
73/04/07	12 20		0.350	1.150	0.210	0.110	0.280
73/04/15	17 40		0.850	6.300	2.900	1.047	1.710
73/05/08	20 40		1.020	4.750	2.100	0.960	1.720
73/05/20	20 45		0.820	5.500	3.200	0.790	1.150
73/06/05	17 10		1.200	7.400	0.145	1.200	1.800
73/07/09	22 30		0.550	1.380	0.430	0.460	0.575
73/08/05	12 35		2.400	4.900	0.390	1.470	2.300
73/09/06	22 40		0.460	3.500	0.176	0.270	0.932
73/10/04	21 55		0.650	1.470	0.160	0.310	0.440

STORET RETRIEVAL DATE 74/11/26

3630F1 LS3630F1
42 55 00.0 073 45 00.0
ANTHONY KILL CREEK
36 7.5 MECHANICSVIL
T/ROUND LAKE
MED DUTY RD BRIDGE NEAR COONS
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
72/11/04	12 05		0.540	0.580	0.072	0.084	0.168
72/12/01	11 20		0.280	0.600	0.075	0.014	0.044
73/01/05	12 40		0.400		0.032	0.018	0.040
73/02/05	14 40		0.500	0.750	0.068	0.023	0.105
73/03/07	10 30		0.440	2.100	0.063	0.025	0.550
73/04/07	10 05		0.273	1.150	0.168	0.010	0.040
73/04/15	16 40		0.250	2.310	0.098	0.025	0.090
73/05/08	20 00		0.320	1.600	0.056	0.048	0.110
73/05/20	20 16		0.330	0.850	0.054	0.044	0.125
73/06/05	16 20		0.320	1.1[illegible]	0.147	0.061	0.160
73/07/09	21 50		0.320	[illegible]	0.126	0.069	0.195
73/08/05	11 45		0.680	1.[illegible]	0.063	0.090	0.175
73/09/06	20 35		1.260	2.0[illegible]	0.590	0.048	0.240
73/10/08	21 20		0.880	1.000	0.078	0.085	0.140